

WHAT IS CLAIMED IS:

1. An apparatus comprising:

5 processing hardware;

 one or more physical storage devices;

 an operating system executable on the processing hardware; and

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 a storage management system executable on the processing hardware, wherein the
 storage management system is configured to provide one or more virtual
 storage devices for use by the operating system, and wherein the storage
 management system is configured to map files representing the virtual
15 storage devices to a plurality of volumes to be stored on the physical
 storage devices.

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2. The apparatus as recited in claim 1 wherein the storage management system is further
configured to map the plurality of volumes to the physical storage devices according to
one or more volume attributes.

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3. The apparatus as recited in claim 1 wherein the storage management system is further
configured to replicate one or more of the plurality of volumes to a second one or more
physical storage devices remote from the one or more physical storage devices.

4. The apparatus as recited in claim 1 wherein the storage management system is further
configured to perform hierarchical storage management on the files representing the
virtual storage devices.

5. The apparatus as recited in claim 1 further comprising network hardware coupled to the processor hardware, wherein at least one of the physical storage devices is coupled to the processing hardware through the network hardware.
- 5 6. The apparatus as recited in claim 1 wherein the storage management system is further configured to provide virtual network hardware for use by the operating system.
7. The apparatus as recited in claim 6 wherein the operating system communicates with at least one of the virtual storage devices through the virtual network hardware.
- 10 8. The apparatus as recited in claim 1 wherein the storage management system is further configured to schedule the operating system for execution on the processing hardware.
9. The apparatus as recited in claim 8 further comprising multiple processing hardware,
15 wherein the storage management system is further configured to schedule the operating system for execution on a first processor hardware of the multiple processor hardware.
10. The apparatus as recited in claim 9 wherein the storage management system provides a same set of the virtual storage devices for use by the operating system independent of
20 which of the multiple processor hardware on which the operating system is scheduled to execute.
11. The apparatus as recited in claim 8 further comprising an application configured to execute with the operating system, wherein the storage management system is further
25 configured to schedule the application for execution on the processing hardware.
12. The apparatus as recited in claim 1 wherein the processing hardware includes one or more processors, and wherein a first processor on which the operating system is executing traps on commands to the virtual storage devices by the operating system, the trap

occurring prior to the first processor transmitting the command external to the first processor.

13. A computer accessible medium comprising instructions which, when executed on
5 processing hardware:

provides one or more virtual storage devices for use by an operating system which
is also executable on the processing hardware; and

10 maps files representing the virtual storage devices to a plurality of volumes to be
stored on physical storage devices coupled to the processing hardware.

14. The computer accessible medium as recited in claim 13 wherein the instructions,
when executed, map the plurality of volumes to the physical storage devices according to
15 one or more volume attributes.

15. The computer accessible medium as recited in claim 13 wherein the instructions,
when executed, replicate one or more of the plurality of volumes to a second one or more
physical storage devices remote from the one or more physical storage devices.

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16. The computer accessible medium as recited in claim 13 wherein the instructions,
when executed, perform hierarchical storage management on the files representing the
virtual storage devices.

25 17. The computer accessible medium as recited in claim 13 wherein the instructions,
when executed, provide virtual network hardware for use by the operating system.

18. The computer accessible medium as recited in claim 13 wherein the instructions,
when executed, schedule the operating system for execution on the processing hardware.

19. The computer accessible medium as recited in claim 18 wherein the instructions, when executed, schedule the operating system for execution on a first processor hardware of multiple processor hardware.

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20. The computer accessible medium as recited in claim 19 wherein the instructions, when executed, provide a same set of the virtual storage devices for use by the operating system independent of which of the multiple processor hardware on which the operating system is scheduled to execute.

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21. An apparatus comprising:

processing hardware;

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an operating system executable on the processing hardware; and

a storage management system executable on the processing hardware, the storage management system comprising one or more storage management components, wherein the storage management system is configured to provide one or more virtual storage devices for use by the operating system, and wherein a set of storage commands supported by the storage management system for the virtual storage devices includes: (i) a set of standard commands used by the operating system to communicate with storage devices, and (ii) one or more additional commands for communicating with the storage management components.

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22. The apparatus as recited in claim 21 further comprising an application configured to execute with the operating system, wherein the application is configured to cause the additional commands to be used to communicate between the application and the storage

management components.

23. The apparatus as recited in claim 21 wherein the virtual storage devices are virtual small computer systems interface (SCSI) devices.

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24. The apparatus as recited in claim 23 wherein the additional commands comprise additional input/output control (IOCTL) commands.

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25. The apparatus as recited in claim 21 wherein the storage management components include a file system.

26. The apparatus as recited in claim 21 wherein the storage management components include a volume manager.

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27. The apparatus as recited in claim 21 wherein the storage management components include a volume replicator.

28. The apparatus as recited in claim 21 wherein the storage management components include a hierarchical storage manager.

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29. A computer accessible medium comprising instructions forming one or more storage management components, wherein the instructions, when executed, provide one or more virtual storage devices for use by an operating system, and wherein a set of storage commands supported for the virtual storage devices includes: (i) a set of standard commands used by the operating system to communicate with storage devices, and (ii) one or more additional commands for communicating with the storage management components.

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30. The computer accessible medium as recited in claim 29 wherein the virtual storage

devices are virtual small computer systems interface (SCSI) devices.

31. The computer accessible medium as recited in claim 30 wherein the additional commands comprise additional input/output control (IOCTL) commands.

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32. The computer accessible medium as recited in claim 29 wherein the storage management components include a file system.

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33. The computer accessible medium as recited in claim 29 wherein the storage management components include a volume manager.

34. The computer accessible medium as recited in claim 29 wherein the storage management components include a volume replicator.

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35. The computer accessible medium as recited in claim 29 wherein the storage management components include a hierarchical storage manager.

36. A method comprising:

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providing one or more virtual storage devices for use by an operating system; and

mapping files representing the virtual storage devices to a plurality of volumes to be stored on one or more physical storage devices.

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37. The method as recited in claim 36 further comprising mapping the plurality of volumes to the physical storage devices according to one or more volume attributes.

38. The method as recited in claim 36 further comprising replicating one or more of the plurality of volumes to a second one or more physical storage devices remote from the

one or more physical storage devices.

39. The method as recited in claim 36 further comprising performing hierarchical storage management on the files representing the virtual storage devices.

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40. The method as recited in claim 36 further comprising providing virtual network hardware for use by the operating system.

41. The method as recited in claim 36 further comprising scheduling the operating
10 system for execution.

42. The method as recited in claim 36 further comprising scheduling the operating system for execution on a first processor hardware of multiple processor hardware.

15 43. The method as recited in claim 42 further comprising providing a same set of the virtual storage devices for use by the operating system independent of which of the multiple processor hardware on which the operating system is scheduled to execute.

44. A method comprising providing one or more virtual storage devices for use by an
20 operating system, wherein a set of storage commands supported for the virtual storage devices includes: (i) a set of standard commands used by the operating system to communicate with storage devices, and (ii) one or more additional commands for communicating with storage management components in a storage management system.

25 45. The method as recited in claim 44 wherein the virtual storage devices are virtual small computer systems interface (SCSI) devices.

46. The method as recited in claim 45 wherein the additional commands comprise additional input/output control (IOCTL) commands.

47. The method as recited in claim 44 wherein the storage management components include a file system.

5 48. The method as recited in claim 44 wherein the storage management components include a volume manager.

49. The method as recited in claim 44 wherein the storage management components include a volume replicator.

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50. The method as recited in claim 44 wherein the storage management components include a hierarchical storage manager.

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